

**Activity Title:** Everything is Connected

**Subject:** Symbiotic Relationships: Commensalism

**Grade Level:** 5-8th

**Average Learning Time:** 2-5 periods

**Lesson Summary (Overview/Purpose):** Students will display understanding of the importance of commensalism and symbiotic relationships within an ecosystem.

**Overall Concepts (Big Idea/Essential Question):**

1. Why are symbiotic relationships important in an ecosystem?
2. What types of relationships are found among species within an ecosystem?
3. How important are individual species to an ecosystem?

**Specific Concepts (Key Concepts):**

1. Conducting population surveys is important in the monitoring of an ecosystem.
2. Protecting each individual species is important to the health of the ecosystem.
3. Species adapt to live and thrive in the ecosystem in which they are found.
4. The loss of a species impacts other species.
5. There are different types of relationships among species.

**Focus Questions (Specific Questions):**

- How can symbiotic relationships among organisms in an ecosystem influence populations?
- Why are interactions between organisms important?
- What would an ecosystem with no interactions be like?
- How does commensalism between two species work?
- What are some ways that humans interact with the species in an ecosystem?
- How can population surveys help monitor the health of an ecosystem?

**Objectives/Learning Goals:**

Students will be able to describe and define commensalism.

Students will be able to apply their knowledge and understanding of symbiotic relationships to real world examples.

Students will be able to determine if a symbiotic relationship is one of commensalism.

**Background Information:**

Students must have general knowledge of ecosystems and must be familiar with the idea that organisms interact with each other when they live in the same habitat. Because this is geared towards younger students they will have a basic understanding and use simple vocabulary terms. Students need to be able to follow simple instructions to participate in activities.

**Common Misconceptions/Preconceptions:**

Students probably have a few misconceptions when this lesson is introduced, because they have had limited exposure to species interactions. Students may not think it would impact an ecosystem if an

organism was removed. Also, students may not understand that a predator, such as a shark, could have a relationship with a smaller organism, such as a remora. Students have not thought about the term “health” applying to their environment.

**Materials:**

**Technical Requirements:** Computer, Projector, chrome books or student computers

**Teacher Preparations:** Print the handouts.

**Keywords:**

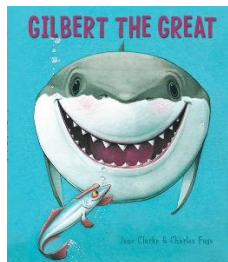
- Biodiversity- variety of living organisms, such as plants and animals in an ecosystem.
- Ecosystem- a community of living and nonliving things that function together.
- Commensalism- a symbiotic relationship where one organism benefits and one does not benefit but is unharmed.
- Symbiotic relationship- living together; a close and usually long-term interaction or association between two or more species who all benefit from the relationship.

**Lesson Procedure:**

Watch <https://youtu.be/p15IrEuhYmo> about ecosystems and food webs.

Teacher will review the vocabulary words from previous lessons with the students: Ecosystem, Symbiotic Relationships, Biodiversity, Mutualism, and Parasitism with students.

Read the picture book Gilbert the Great



**Pre-assessment:**

Ask students to write a paragraph describing the relationship between Gilbert and his friend Raymond. They must list benefits that either might gain from the relationship. Instruct students to think about the relationship in the book, and in a real life setting as well. This will allow the teacher to see what the students’ thoughts are on the relationship even if they have not learned the proper vocabulary terms yet. The teacher will list on the board the benefits of the relationship for Gilbert and for Raymond that the students brainstormed.

**Lesson Procedure**

**1. Notes/Discussion** - Introduce the new vocabulary word commensalism. Commensalism is loosely defined as a symbiotic relationship in which one organism benefits and the other is unaffected. For example, burdock plants produce seed heads called burs that are covered in hooks. The hooks catch in the fur of passing mammals, where they are carried until they fall off. This provides the burdock plant with an effective seed dispersal mechanism, while the mammal is unaffected. Another example of a commensal relationship exists between cattle egrets and cattle. As cattle or other large mammals graze

they stir up insects, which are the prey of the cattle egret. The impact of the cattle egret on cattle or other large mammals is minimal. Ask your students if there is anyone who has a younger sibling who listens when she reads a book she likes. Tell your students this is commensalism, since the younger sibling is benefiting from listening to the story. But she is not affected because she would read the book anyway. Tell your students that an example of commensalism among species is when a vulture eats a lion's leftovers.

**2. Show the students the video clip:** <https://youtu.be/zTGcS7vJqbs> 56-1:41 seconds in will show commensalism. Discuss how the relationship is an example of commensalism. Give students the handouts of commensalism examples and discuss each one.

### 3. Guided Practice-

"[Strawberry Poison Dart Frog](https://youtu.be/4SispCYiUTE)" by National Geographic  
<https://youtu.be/4SispCYiUTE>

Teacher will ask, "What is the relationship between the strawberry poison dart frog and the bromeliad? (This relationship is commensal because the bromeliad is unaffected, while the poison dart frog tadpole benefits by having a safer place to develop.

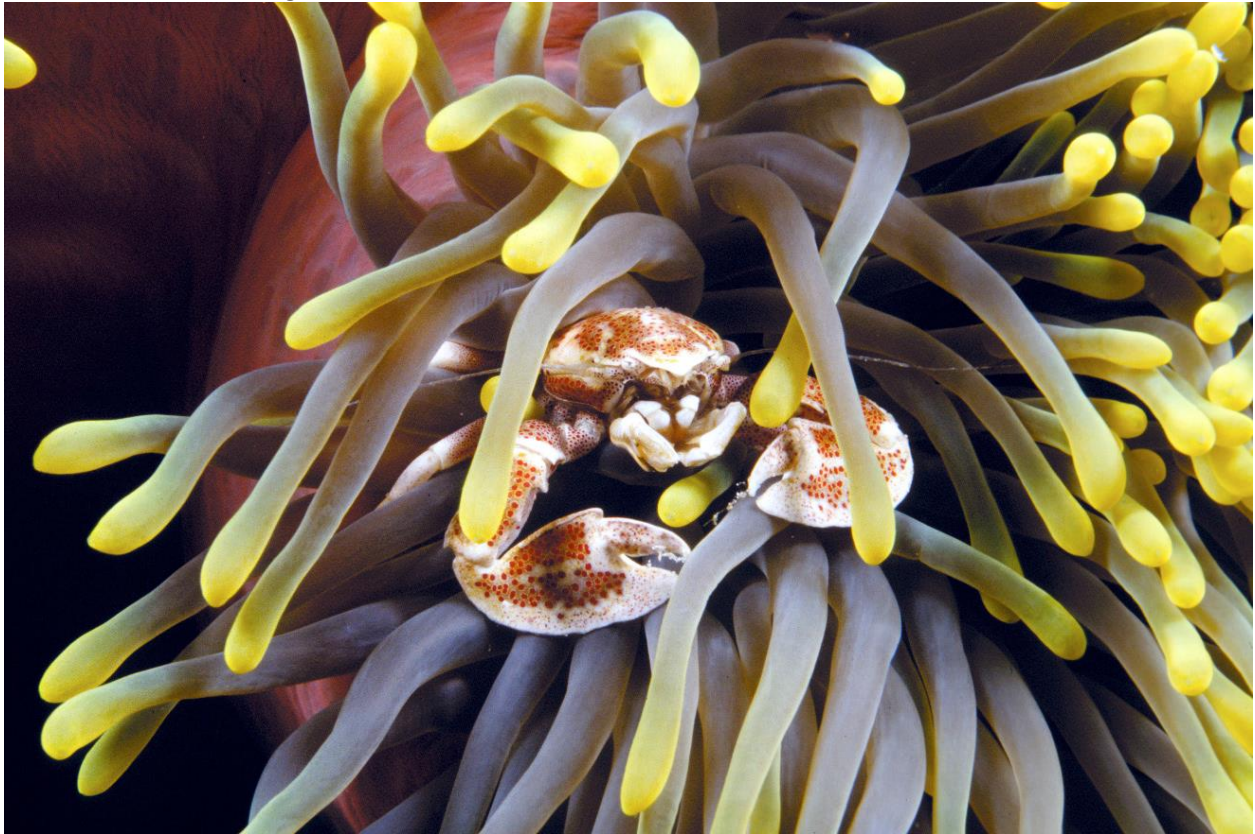
Teacher will ask, "What is the relationship between the coati and the strawberry poison dart frog tadpole? This is actually a relationship called ammensalism in which one organism is negatively affected but the other is unaffected. This is a great question to deepen knowledge because most students will try to fit the relationship into one of the categories they already know, which is not always the best approach in science.

This guided practice could last between 10-20 minutes, depending upon class involvement in discussion of examples.

**4. Student Practice:** Students will create a diagram showing the interactions between organisms of a community in a creative way using color, symbols, etc. to show the relationships. Students will work with a single partner. The students choose an ecosystem where they can identify at least four different organisms and an example of commensalism. Students can research the relationships between the organisms in it using their Chromebooks. After finding the relationships between organisms, students may begin to realize that their diagrams are getting more and more complex. End practice by asking students why studying interactions between organisms might be important for understanding communities. Allow students 30-40 minutes to work on their ecosystem research and creation of diagram. Have each set of students present their diagram to the class.

**5. Checkpoint review:** *Commensalism* is defined as a symbiotic relationship in which one organism benefits and the other is unaffected. Commensal relationships occur very often on the coral reef, many times for camouflage and for protection against predators. This relationship is important for the organism that is being camouflaged, but does not aid in the life of the organism providing the camouflage and does not harm it either. An example of commensalism is the relationship between the Anemone Crab and a Sea Anemone. The Anemone Crab lives in the protection of the Sea Anemone's tentacles and catches its food without ever leaving the safety of the tentacles. However, the crab does not provide any service to the Sea Anemone.

Anemone Crab living inside a Sea Anemone



**6. Student Practice:** The relationship between a remora, sometimes referred to as a sharksucker, and a shark is overwhelmingly referred to as commensalism. The remoras can get some free food from the messy eaters and a free ride but don't have any real impact on the shark. Some scientists however, make the argument that it might at times become a parasitic relationship depending upon the size of the shark, the size of the remora, and the number of remoras involved. For example, if there are multiple remoras following smaller sharks they could potentially create a drag on the shark's movements. Some argue that they can irritate the skin if there are numerous ones attached. As far as mutualism, this may refer to specific types of remoras, some smaller species that are known to act as "cleaners" that feed on skin parasites in the mouths or around the gills of sharks. Students are to research the symbiotic relationship between sharks and remoras and decide for themselves what type of relationship exists. Students will use the "Building an Argument" handout to guide them in setting up their stand on the issue. Students will share their case and debate as a class to decide what type of relationship they feel exists.

**Assessment and Evaluation:** Students will be assessed informally and formally. Students' participation, discussion, and questions will serve as informal assessment of their understanding. Formally, students will create an accurate diagram showing interaction between organisms of a community. They will also be able to formulate an argument on whether the shark and remora relationship is an example of commensalism or not. If 80% of students can display an understanding through their products of a symbiotic relationship then the unit will be deemed a success.

**Differentiation for advanced students:** Students who pick up the concepts quickly may be given the symbiotic relationship table. This will give the students the opportunity to express understanding of

various organisms and their relationships with other organisms. Teacher will instruct students not to use any of the relationships that have been discussed during class.

**Standards:**

**Ocean Literacy Principles Addressed**

5A Ocean life ranges in size from the smallest living things to the largest animal on earth

5D Ocean biology provides many unique examples of life cycles, adaptations, and important relationships among organisms.

5E The ocean provides a vast living space with diverse and unique ecosystems

6A The ocean affects every human life

6B The ocean provides food, medicines, and mineral and energy resources

6E Changes in ocean temperature and pH due to human activities can affect the survival of some organisms and impact biological diversity.

6G Everyone is responsible for caring for the ocean

**Gifted & Talented Standards Addressed**

6.4.1.1 The learner will demonstrate knowledge and understanding of ecosystems and the circumstances and conditions affecting it.

6.4.1.2 The learner will demonstrate knowledge and understanding of society's impact on the natural world.

5.2.1.1 The learner will offer and accept constructive feedback

4.4.1.1 The learner will use technology as a tool to research, organize, evaluate and communicate information

3.1.7.1 The learner will communicate effectively in an informal setting

3.1.4.2 The learner will identify and demonstrate effective body language while listening

3.1.5.1 The learner will use communication to inform

3.1.5.4 The learner will use communication to persuade

2.3.2.1 The learner will assess the accuracy and relevance of points used to support an argument

2.3.2.2 The learner will prove or disprove ideas by presenting evidence

2.1.1.4 The learner will deduce information and draw conclusions

2.2.1.1 The learner will provide supportive evidence for a particular idea, principle or generalization

1.1.5.3 The learner will question relationships and interpretation